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<u>Remarks</u>

I.    <u>Status of the Claims</u>

In the Office Action, the Examiner indicated that claims 1-18 are pending, rejected claims

1-4. 6-15 and 18 and objected to claims 5, 16 and 17.  Therefore, claims 1-18 are pending for

reconsideration.


II.    <u>Rejection of Claims 1 and 15 under 35 U.S.C. §102(e),</u>

In paragraph 2 of the office action, the Examiner rejected claims 1 and 15 under 35 U.S.C

102(e) as being anticipated by Kou (U.S. Pub. No. 2003/0030429A1), hereinafter Kou.

Kou teaches (claim 1), "A method of monitoring an environmental condition associated

with a container containing a set of electronic components...".

Kou's method differs from Applicant's invention in a fundamental way.  Kou's

"container", is a (storage carton (par. 22), sealed compartment for shipping (par 35), tray (par.

43), storage bin (par. 42)) holder of electronic components destined for installation in an

electronic system, and is not a "product" in daily use by a customer as Applicant's invention

teaches.  In fact, Kou's definition of "container" is found in claim 26, "a container of electronic

components to be installed into electronic assemblies, the container comprising:  a storage device

containing a set of electronic components...".  In no place does Kou teach or suggest continued

lifetime estimation upon shipment to a customer and operation by the customer of an assembled

electronic system under power and/or in storage during normal use by the customer.  In contrast,

Applicant teaches throughout his application that the present invention is a part of the assembled

product sold to the customer and which continues to operate during the lifetime of the product,

powered and unpowered, depending on the customer's usage of the product.  For example, on

page 5, lines 5-8, "A principal object of the present invention is to provide a user or a potential

purchaser of a product with an indication of how much of the product's expected life remains."

Applicant's invention clearly includes using output from sensors taken during actual operation of

the product in the customer's hands, and for the entire time of use of the product.  For example,

on page 14, lines 13-15, "Temperature can change more rapidly.  Rapid temperature rise occurs

when a laptop computer leaves a hibernation mode and enters an active mode." To more clearly distinguish Applicant's invention over Kou, Applicant has amended claims 1 and 15 to clarify that the lifetime estimation occurs over the entire lifetime of the product. Furthermore, Applicant has amended claims 1 and 15 to clarify that the sensor, the device that uses said data to calculate an age acceleration factor, the at least one accumulator, and the display, are an integral part of the product, not, as in Kou, simply as a monitor for a tray of parts. Applicant directs the Examiner to page 7, where it is stated on line 21 that "Product 100 is equipped in the example with an embodiment of the invention 110, comprising a group of sensors 112, a processor 111, a nonvolatile storage 113, a display 114, and a clock 115.". Applicant respectfully submits that the amendments to claims 1 and 15 overcome the rejections under 35 USC 102.

III.    Rejection of Claims 2, 3, 4, 6-10, 11, 12-14 under 35 U.S.C. §103(a)

In paragraph 4, Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kou in view of Ramamurthi (U.S. Pat. No. 5251144), Ramamurthi teaching the use of analog to digital converters so that signals can be processed by a digital computer. In paragraph 5, Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kou in view of Ramamurthi, as applied to claims 1 and 2, and in further view of Pastor, et al (U.S. Pat. No. 5371066), Pastor teaching a digital processor programmed to compute an Arrhenius estimate of said age acceleration. In paragraph 6, claim 4 is rejected under 35 U.S.C. 1039a) as being unpatentable over Kou in view of Ramamurthi as applied to claims 1 and 2, and in further view of Talbott (U.S. Pat. No. 6411908), Talbott teaching using a Coffin-Manson equation to calculate an estimate of the remaining life of an electronic component as a function of environmental conditions. In paragraph 7, claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kou in view of Ramamurthi, as applied to claims 1 and 2 and in further view of Kon (U.S. Pat. No. 6249838B1) and Kaehler et al. U.S. Pat. No 6092410). Kon and Kaehler teaches use of nonvolatile storage.

In response, Applicant respectfully notes that Kou is the primary reference in the rejections under 35 U.S.C. 103(a) of claims 2, 3, 4, and 6-10. Applicant believes that the amendment made to claim 1 to more clearly distinguish the present invention over Kou overcomes the use of Kou in claims 2, 3, 4, and 6-10, making claims 2, 3, 4, and 6-10 allowable.

The Examiner used Pastor as a reference with respect to claim 3. Pastor's use of the Arrhenius equation is "According to the Arrhenius rate equation, the rate of reaction k to produce monatomic oxygen is generally related to the activation energy by $k = fe^{[-E/RT]}$, where f is a frequency factor, E is the energy change associated with the reaction under study, R is the gas constant, and T is absolute temperature in Kelvin." Applicant respectfully disagrees with the Examiner's application of Pastor against claim 3. Pastor's invention is explicitly directed not towards avoiding oxidation, but, in fact, to encourage oxidation. In Pastor, col. 2, lines 33-35, Pastor states: "The present invention provides a method for oxidizing the precursor materials for superconducting oxides in a precise, controllable, fashion." Applicant respectfully submits that a reverse application of Pastor is impermissible hindsight, and that, therefore, claim 3 is allowable even if Kou is maintained.

With regard to claim 4, the Examiner's secondary reference does teach programming a digital processor to compute an Arrhenius estimate of age acceleration, and, if Kou is maintained, claim 4 would be not allowable. As stated above, Applicant believes the amendment to claim 1 overcomes the Kou reference.

With regard to claims 6-10, the Examiner's secondary references do teach similar use of nonvolatile storage, and, if Kou is maintained, claims 6-10 would be not allowable. As stated above, Applicant believes the amendment to claim 1 overcomes the Kou reference.

In paragraph 8, the Examiner rejects claim 11 under U.S.C. 35 103(a) as being unpatentable over Kou in view of Berger, et. al., (U.S. Pat. No. 6043464). Applicant respectfully submits, again, that Kou does not teach the present invention, as amended, in claim 1, and that claim 11 is therefore allowable. Furthermore, although Berger does teach a temperature sensor that produces an analog voltage output, said analog voltage output varying substantially linearly responsive to a change in temperature, Berger teaches away from the present invention by his use of the analog voltage. Rather than using the analog voltage as a source of temperature information that is subsequently integrated in an accumulator in an exponential fashion, Berger couples the analog voltage to a comparator (col. 3, line 23), so that when the analog voltage reaches a predetermined voltage, a heater is turned on by triac 24 (col. 4 line 45), or a thermal cutout is triggered (col. 5, line 11). Applicant respectfully therefore submits that claim 11 is

allowable even if Kou were maintained as a reference. Applicant has amended claim 11 to clarify that the voltage output of the sensor is the "data" of claim 1.

In paragraph 9, the Examiner rejects claims 12-14 under 35 U.S.C. 103(a) as being unpatentable over Kou in view of Berger, as applied to claim 11 above and in further view of Johnson (U.S. Pat. No. 5694132). Applicant respectfully submits again, that Kou does not teach the present invention, as amended, in claim 1, from which claims 12-14 depend directly or indirectly. Furthermore, Applicant directs the Examiner's attention to Johnson, col. 2, lines 12-13 where the VCO discussed is described as quasi logarithmic versus input voltage, not exponential versus input voltage, as described in Applicant's claim 12. Johnson, also teaches away from the present invention, in that his invention seeks to linearize the response of his "quasi logarithmic" VCO, using "quasi exponential voltages" at the input. In short, Johnson uses exponential inputs to a logarithmic VCO to produce a linear frequency sweep. In contrast, Applicant's invention has a linear input voltage to an exponential VCO, and counts (claim 13) the cycles of the exponential VCO to approximate a wearout accumulation. Applicant has amended claim 12 to clarify that the VCO output has a frequency. It is the frequency of this output, as taught in the application, that represents the ageing factor; this frequency is, in turn, integrated by the accumulator (counter), as claimed in claim 13. Claim 14 is directed to display of the accumulated aging of the product, and depends from claims applicants believe are allowable. Applicant respectfully submits that none of the references the Examiner has cited teach or suggest the "linear sensor – exponential VCO – counter" aging estimation apparatus as taught and claimed in the present invention. Applicant therefore respectfully submits that claims 11, 12, 13, and 14 are allowable even if Kou and Berger are maintained as references.

As noted above, independent claim 15 has been amended in a manner similar to claim 1 to more clearly distinguish over Kou. Applicant respectfully submits that claim 15, as amended, is allowable over Kou.

In paragraph 10, claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kou in view of Grimm (U.S. Pub. o. 2002/0107589A1). Applicant respectfully submits that claim 15 is allowable over Kou, as amended, and therefore, claim 18 is allowable.

III.    Allowable Subject Matter claims 5, 16, and 17

Applicant thanks the Examiner for stating that claims 5, 16, and 17 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response to the objection to claim 5, Applicant has cancelled claim 5 and has rewritten claim 5, including all the limitations of claims 1 and 2 from which claim 5 depended, as new independent claim 19, which is allowable, per the Examiner's statement.

In response to the objection to claim 16, Applicant has cancelled claim 16 and has rewritten claim 16, including all the limitations of claim 15 from which claim 16 depended, as new independent claim 20, which is allowable, per the Examiner's statement.

In response to the objection to claim 17, Applicant has cancelled claim 17 and has rewritten claim 17, including all the limitations of claim 15 from which claim 17 depended, as new independent claim 21, which is allowable, per the Examiner's statement.

IV.    Conclusion

In view of the foregoing comments and amendments, the Applicants respectfully submit that pending claims 1-4, 6-15, 18, and new claims 19, 20, and 21 are in condition for allowance and that the application should be passed to issue.

Respectfully submitted,

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